



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Colvin, et al

Atty. Docket: 60102.0004USU1

Serial No: 10/622,976

Halliburton Docket: 2002-IP-008552US

Date Filed: July 18, 2003

Examiner: Thangavelu, K.

Art Unit: 2123

Title: A SYSTEM AND METHOD FOR AUTOMATED RESERVOIR TARGETING

Certificate of Mailing

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop PETITION, Commissioner for Patents, Washington, D.C. 22313-1450 on April 4, 2005.

Alton Hornsby III

Mail Stop PETITION
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

**PETITION TO WITHDRAW HOLDING OF ABANDONMENT UNDER
37 C.F.R. §1.181(a)**

Dear Sir or Madam:

Pursuant to 37 C.F.R. § 1.181(a), it is respectfully requested that the holding of abandonment indicated in the Notice of Abandonment mailed March 23, 2005 be withdrawn.

APPLICANT HEREBY PETITIONS FOR WITHDRAWAL OF THE HOLDING OF
ABANDONMENT IN THIS APPLICATION.

As evidence for this petition, a copy of the USPTO stamped Postcard Receipt indicating that a Transmittal Sheet in duplicate containing a Certificate of Mailing and a Response (to the outstanding Office Action) were mailed on September 23, 2004 and received by the USPTO on

September 27, 2004, is enclosed herewith. Also enclosed herewith is a copy of the Response mailed on September 23, 2004.

Pursuant to MPEP § 711.03(c)(I), no fee for this petition is required.

Remarks

In the above-referenced application, a Non-Final Office Action was mailed on June 25, 2004. In the Notice of Abandonment mailed on March 23, 2005, the application was deemed abandoned in because a reply to the Office Action was not being received.

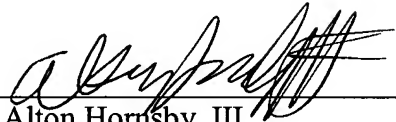
The enclosed postcard receipt stamped by the USPTO properly identifies the reply (i.e., a Response and Amendment), the title of the application, the first named inventor of the application, the filing date of the application, and the mailing date of the reply (i.e., September 23, 2004). It should be noted that the postcard mailed with the reply contained a typographical error misidentifying the serial number of the present application. In particular, the serial number on the postcard reads "09/622,976" instead of "10/622,976 based on the aforementioned evidence, it is respectfully submitted that, pursuant to MPEP 503 and 711.03(c) I. B., the stamped postcard receipt properly identifies the application and thus provides *prima facie* evidence that the reply was timely filed. Therefore, based on the aforementioned evidence, it is respectfully submitted that the holding of abandonment should be withdrawn.

If there are any questions regarding this matter, please call the undersigned at
404.954.5100.

Respectfully submitted,

MERCHANT & GOULD

Date: April 4, 2005


Name: Alton Hornsby, III

Reg. No.: 47,299

Merchant & Gould P.C.
P.O. Box 2903
Minneapolis, MN 55402-0903
404.954.5100

23552

PATENT TRADEMARK OFFICE



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Colvin et al
Examiner: Thangavelu, K.
Serial No.: 10/622,976
Group Art Unit: 2123
Filed: July 18, 2003
Docket: 60102.0004USU1
Title: A System and Method for Automated Reservoir Targeting

CERTIFICATE UNDER 37 CFR 1.8:

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail, with sufficient postage, in an envelope addressed to: Mail Stop Petition, Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 April 4, 2005.

By: 

Name: Alton Hornsby, III

Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

23552

PATENT TRADEMARK OFFICE

Sir:

We are transmitting herewith the attached:

- ☒ Transmittal Sheet in duplicate containing Certificate of Mailing
- ☒ Other: Petition To Withdraw Holding of Abandonment Under 37 C.F.R. 1.181(a)
- ☒ Return postcard

Please consider this a PETITION FOR EXTENSION OF TIME for a sufficient number of months to enter these papers or any future reply, if appropriate. Please charge any additional fees or credit overpayment to Deposit Account No. 13-2725. A duplicate of this sheet is enclosed.

Merchant & Gould P.C.
P.O. Box 2903
Minneapolis, MN 55402-0903
404.954.5100

By: 

Name: Alton Hornsby, III

Reg. No.: 47,299

AH



COPY

Receipt is hereby acknowledged for the following in the U.S. Patent and Trademark Office:

In re Application of: Colvin
For: A System and Method for Automated Reservoir Targeting
Docket No.: 60102.0004USU1
Serial No.: 09/622,976
Filed: July 18, 2003
Due Date: September 25, 2004
Date Mailed: September 23, 2004

- ☒ Transmittal Sheet in duplicate containing Certificate of Mailing
- ☒ Response and Amendment
- ☒ Return postcard

Patent
AH / Atlanta

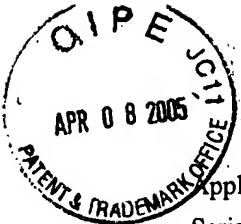
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Patent
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

COPY

Applicant: Colvin
Serial No.: 09/622,976
Filed: July 18, 2003
Confirmation No.: 3006
Examiner: Thangavelu, K.
Group Art Unit: 2123
Docket: 60102.0004USU1
Halliburton #: 2002-IP-008552US
Due Date: September 25, 2004
Title: A System and Method for Automated Reservoir Targeting

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By: 

Name: Alton Hornsby, III

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

23552

PATENT TRADEMARK OFFICE

Sir:

We are transmitting herewith the attached:

☒ Transmittal Sheet in duplicate containing Certificate of Mailing☒ Response and Amendment

The fee has been calculated as shown below in the "Claims as Amended" table

☒ Return postcard**CLAIMS AS AMENDED**

Claims Remaining After Amendment		Highest Number Previously Paid For		Present Extra		Rate		Fee
Total Claims								
32	-	29	=	3	x	18.00	=	\$54.00
Independent Claims								
3	-	3	=	0	x	86.00	=	\$0.00
MULTIPLE DEPENDENT CLAIM FEE								\$0.00
TOTAL FILING FEE								54.00

Please consider this a PETITION FOR EXTENSION OF TIME for a sufficient number of months to enter these papers or any future reply, if appropriate. Please charge any additional fees or credit overpayment to Deposit Account No. 13-2725. A duplicate of this sheet is enclosed.

MERCHANT & GOULD P.C.
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404.954.5100

By: 

Name: Alton Hornsby, III

Reg. No.: 47,299

AH



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Colvin
Serial No.: 09/622,976
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Confirmation No.: 3006
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P.O. Box 1450
Alexandria, VA 22313-1450

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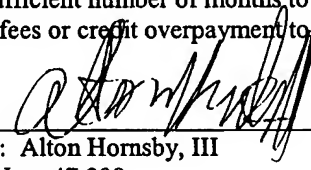
- ☒ Transmittal Sheet in duplicate containing Certificate of Mailing
☒ Response and Amendment
The fee has been calculated as shown below in the "Claims as Amended" table
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CLAIMS AS AMENDED

Claims Remaining After Amendment		Highest Number Previously Paid For		Present Extra		Rate		Fee
Total Claims								
32	-	29	=	3	x	18.00	=	\$54.00
Independent Claims								
3	-	3	=	0	x	86.00	=	\$0.00
MULTIPLE DEPENDENT CLAIM FEE								\$0.00
TOTAL FILING FEE								54.00

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MERCHANT & GOULD P.C.
P.O. Box 2903, Minneapolis, MN 55402-0903
404.954.5100

By: 
Name: Alton Hornsby, III
Reg. No.: 47,299
AH

Application Serial No. 10/622,976
Atty. Docket No. 60102.0004USU1

Application Serial No. 10/622,976
Atty. Docket No. 60102.0004USU1

APR 08 2005
PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Colvin	Atty. Docket:	60102.0004USU1
Serial No:	09/622,976	Halliburton Docket:	2002-IP-008552US
Date Filed:	July 18, 2003	Examiner:	Thangavelu, K.
Art Unit:	2123		
Title:	A SYSTEM AND METHOD FOR AUTOMATED RESERVOIR TARGETING		

Certificate of Mailing

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Alton Hornsby III

**Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450**

RESPONSE AND AMENDMENT

Dear Sir:

In response to the Non-Final Office Action mailed June 25, 2004, Applicants respectfully request entry of the following claim amendments and consideration of the following remarks addressing all points raised in the Office Action.

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims which begins on page 4 of this paper.

Remarks begin on page 13 of this paper.

AMENDMENTS TO THE SPECIFICATION

Please amend paragraphs 042, 045, 061, 064, 065, and 066 in the Specification as follows:

$$[042] \quad \text{AccumValue} = (\text{CumWeightedValue} / \text{CumWeightCuWeight}) \quad *$$

CumWeightedArea, wherein

[045] Weight in the above calculations is derived using the relationship: $\text{weight} = (\text{SpacingRadius} - \text{DistanceFromCell} / \text{DistanceFromCell}) / \text{SpacingRadius}$, wherein DistanceFromCell is defined as the larger of the actual distance from the cell for which the accumulated value is being calculated to the adjacent cell that is being taken into consideration or half the diagonal cell width (average distance to corner); and SpacingRadius is a user-defined value representing the reservoir draining radius for each target. The SpacingRadius may be selected by the user based on a number of parameters (e.g., government regulations and/or financial considerations).

$$[061] \quad \text{AccumValue} = (\text{CumWeightedValue} / \text{CumWeightCuWeight}) \quad *$$

CumWeightedArea, wherein

[064] The “weight” in the above calculations may be derived using the relationship: $\text{weight} = (\text{SpacingRadius} - \text{DistanceFromCell} / \text{DistanceFromCell}) / \text{SpacingRadius}$, wherein DistanceFromCell is defined as the larger of the actual distance from the cell for which the accumulated value is being calculated to the adjacent cell that is being taken into consideration

or the half the diagonal cell width (average distance to corner); and SpacingRadius is a user-defined value representing the reservoir draining radius for each target. The SpacingRadius may be selected by the user based on a number of parameters (e.g., government regulations and/or financial considerations).

[065] Once the summation matrix is complete, the summation matrix is analyzed to determine the most desirable value in the matrix. (Stage 1014) Then, the location associated with this value is selected as the first target location (Stage 1016) and the value in the matrix associated with the first target and the values associated ~~value-associate~~ with other[[s]] cells ~~cell~~ in the matrix that are within two times the user-defined radius are set to a value of zero for the selection of the next target location. (Stage 1018)

[066] Next, method 1000 proceeds to Stage 1020. In this stage, if a user-defined maximum cutoff for the number of targets has been reached or all the possible target have been located, method 1000 ends. (Stage 1020 and 1022). However, if the above is not true, method 1000 returns to Stage 1016 and selects, from the remaining values in the summation matrix, the most desirable value as the next target location. Then, in similar fashion to the process used to determine the previous target, the value in the matrix associated with the current target and the values associated ~~value-associate~~ with other[[s]] cells ~~cell~~ in the matrix that are within two times the user-defined radius are set to a value of zero.

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method of reservoir targeting, comprising:

filtering a plurality of values characterizing a reservoir ~~a plurality of values~~ in a three-dimensional model to eliminate values which are below a threshold to create a filtered three-dimensional model;

developing a first matrix from the filtered three-dimensional model representing a two-dimensional model of the reservoir, wherein the first matrix includes a plurality of cell center locations, cell areas, and the plurality of values;

developing a second matrix from the first matrix using a distance-weighted sum of the plurality of values; and

selecting target locations from the second matrix based on the distance-weighted sum of the plurality of values.

2. (Currently Amended) The method of claim 1, wherein developing the first matrix further comprises windowing one or more cells from the filtered three-dimensional model to determine a center point location with a value of interest, wherein the value of interest comprises a multiple of the radius of each of the selected target locations.

3. (Original) The method of claim 2, further comprising windowing the one or more cells using a window determined based on the number of layers in the filtered three-dimensional model of the reservoir.

4. (Original) The method of claim 1, wherein filtering includes using at least one user-defined filter.

5. (Currently Amended) The method of claim 1, wherein developing the second matrix further comprises deriving a cumulative value associated with each center location using the relationship: $\text{cumulative value} = (\text{CumWeightedValue} / \text{CumWeightedArea}) * \text{CumWeightedArea}$, wherein

$$\text{CumWeightedValue} = \sum \text{cellvalue} * \text{weight},$$

$$\text{CumWeightedArea} = \sum \text{cellarea} * \text{weight}, \text{ and}$$

$\text{CumWeight} = \sum (\text{SpacingRadius} - \frac{\text{DistanceFromCell}}{\text{DistanceFromCell}}) / \text{SpacingRadius}$, where SpacingRadius is a user-defined value and DistanceFromCell is defined as one of the larger of an actual distance from a cell under consideration to an adjacent cell and half the diagonal cell width.

6. (Original) The method of claim 1, wherein selecting target locations includes determining whether there are existing targets for the reservoir, and if existing targets are identified, eliminating possible targets within a predetermined distance from the existing targets before selecting new targets.

7. (Currently Amended) The method of claim 6, wherein selecting target locations includes an iterative process of selecting the targets based on a first preferred value, eliminating other

targets within a predetermined ~~predetermine~~ distance from an initial target, and selecting a next preferred value for a next target location.

8. (Currently Amended) The method of claim 1, wherein selecting target locations includes an iterative process of selecting a target based on a preferred value, eliminating other targets within a predetermined ~~predetermine~~ distance from a initial target, and selecting a next preferred value for a next target location.

9. (Currently Amended) The method of claim 1, wherein selecting target locations further comprises ranking the selected target locations and displaying a user-selected percentage of the ranked target locations. ~~selecting one of a certain percentage and a certain number of targets selected.~~

10. (Original) The method of claim 1, further comprising triangulating a three-dimensional model before filtering the plurality of values.

11. (Currently Amended) A computer-readable medium having computer-executable instructions which when executed on a computer perform ~~for performing~~ stages comprising:

filtering a plurality of values characterizing a reservoir ~~a plurality of values~~ in a three-dimensional model to eliminate values which are below a threshold to create a filtered three-dimensional model;

developing a first matrix from the filtered three-dimensional model representing a two-dimensional model of the reservoir, wherein the first matrix includes a plurality of cell center locations, cell areas, and the plurality of values;

developing a second matrix from the first matrix using a distance-weighted sum of the plurality of values; and

selecting target locations from the second matrix based on the distance-weighted sum of the plurality of values.

12. (Currently Amended) The computer-readable medium of claim 11, wherein developing the first matrix further comprises windowing one or more cells from the filtered three-dimensional model to determine a center point location with a value of interest, wherein the value of interest comprises a multiple of the radius of each of the selected target locations.

13. (Original) The computer-readable medium of claim 12, further comprising windowing the one or more cells using a window determined based on the number of layers in the filtered three-dimensional model of the reservoir.

14. (Original) The computer-readable medium of claim 11, wherein filtering includes using at least one user-defined filter.

15. (Currently Amended) The computer-readable medium of claim 11, wherein developing the second matrix further comprises deriving a cumulative value associated with each center location using the relationship: cumulative value = (CumWeightedValue/CumWeight ~~CuWeight~~)

* CumWeightedArea, wherein

$$\text{CumWeightedValue} = \sum \text{cellvalue} * \text{weight},$$

$$\text{CumWeightedArea} = \sum \text{cellarea} * \text{weight}, \text{ and}$$

$$\text{CumWeight} = \sum (\text{SpacingRadius} - \frac{\text{DistanceFromCell}}{\text{DistanceFromCell}})$$

Cell)/SpacingRadius, where SpacingRadius is a user-defined value and DistanceFromCell is defined as one of the larger of an actual distance from a cell under consideration to an adjacent cell and half the diagonal cell width.

16. (Original) The computer-readable medium of claim 11, wherein selecting target locations includes determining whether there are existing targets for the reservoir, and if existing targets are identified, eliminating possible targets within a predetermined distance from the existing targets before selecting new targets.

17. (Currently Amended) The computer-readable medium of claim 16, wherein selecting target locations includes an iterative process of selecting the targets based on a first preferred value, eliminating other targets within a predetermined ~~predetermine~~ distance from an initial target, and selecting a next preferred value for a next target location.

18. (Currently Amended) The computer-readable medium of claim 11, wherein selecting target locations includes an iterative process of selecting a target based on a preferred value, eliminating other targets within a predetermined ~~predetermine~~ distance from a initial target, and selecting a next preferred value for a next target location.

19. (Currently Amended) The computer-readable medium of claim 11, wherein selecting target locations further comprises ranking the selected target locations and displaying a user-selected percentage of the ranked target locations. ~~selecting one of a certain percentage and a certain number of targets selected.~~

20. (Original) The computer-readable medium of claim 11, further comprising triangulating a three-dimensional model before filtering the plurality of values.

21. (Currently Amended) A computer system, comprising:

a user interface;

memory storage means;

a processor coupled to the user interface and the memory storage means, the processor operable to:

filter a plurality of values characterizing a reservoir in a three-dimensional model to eliminate values which are below a threshold to create a filtered three-dimensional model;

develop a first matrix from the filtered three-dimensional model representing a two-dimensional model of the reservoir, wherein the first matrix includes a plurality of cell center locations, cell areas, and the plurality of values;

develop a second matrix from the first matrix using a distance-weighted sum of the plurality of values;

select target locations from the second matrix based on the distance-weighted sum of the plurality of values; and

display on the user interface the selected target locations.

22. (Currently Amended) The computer system of claim 21, wherein the processor develops the first matrix by windowing one or more cells from the filtered three-dimensional model to determine a center point location with a value of interest, wherein the value of interest comprises a multiple of the radius of each of the selected target locations.

23. (Original) The computer system of claim 22, wherein the processor determines the windowing of the one or more cells based on the number of layers in the filtered three-dimensional model of the reservoir.

24. (Original) The computer system of claim 21, wherein the processor filters the plurality of values using at least one user-defined filter.

25. (Currently Amended) The computer system of claim 21, wherein the processor develops the second matrix by deriving a cumulative value associated with each center location using the relationship: $\text{cumulative value} = (\text{CumWeightedValue} / \text{CumWeight} \cdot \text{CumWeightedArea})$, wherein

$$\text{CumWeightedValue} = \sum \text{cellvalue} * \text{weight},$$

$$\text{CumWeightedArea} = \sum \text{cellarea} * \text{weight}, \text{ and}$$

$\text{CumWeight} = \sum (\text{SpacingRadius} - \frac{\text{DistanceFromCell}}{\text{DistanceFromCell}}) / \text{SpacingRadius}$, where SpacingRadius is a user-defined value and DistanceFromCell is defined as one of the larger of an actual distance from a cell under consideration to an adjacent cell and half the diagonal cell width.

26. (Original) The computer system of claim 21, wherein the processor selects target locations by determining whether there are existing targets for the reservoir, and if existing targets are identified, eliminating possible targets within a predetermined distance from the existing targets before selecting new targets.

27. (Currently Amended) The computer system of claim 26, wherein the processor selects target locations using an iterative process of selecting the targets based on a first preferred value, eliminating other targets within a predetermined ~~predetermine~~ distance from an initial target, and selecting a next preferred value for a next target location.

28. (Currently Amended) The computer system of claim 21, wherein the processor selects target locations using an iterative process of selecting a target based on a preferred value, eliminating other targets within a predetermined ~~predetermine~~ distance from a initial target, and selecting a next preferred value for a next target location.

29. (Original) The computer system of claim 21, wherein the computing platform triangulates a three-dimensional model before filtering the plurality of values.

30. (New) The method of claim 5, wherein the cumulative value comprises at least one accumulated value.

31. (New) The computer-readable medium of claim 15, wherein the cumulative value comprises at least one accumulated value.

32. (New) The computer system of claim 25, wherein the cumulative value comprises at least one accumulated value.

Remarks

In response to the Office Action mailed June 25, 2004, the Applicants respectfully request reconsideration of the pending claims based on the above amendments and the following remarks. The pending claims are believed to be in allowable condition.

As noted above, paragraphs 42, 45, 61, 64, 65, 66 and claims 1, 2, 5, 7, 8, 9, 11, 12, 15, 17, 18, 19, 21, 22, 25, 27, and 28 in the Specification have been amended. In addition, claims 30-32 have been added. Paragraphs 42, 45, 61, 64, 65, and 66 have been amended to correct typographical errors noted by the Examiner in the Office Action of June 25, 2004. No new matter has been added by these amendments.

Claims 1, 11, and 21 have been amended to clarify that the method, system, and computer-readable medium for reservoir targeting includes filtering a plurality of values characterizing a reservoir in a three-dimensional model. Support for these amendments may be found in paragraph 32 on pages 10-11 of the Specification. No new matter has been added by these amendments. Claim 11 has further been amended to specify that the recited computer-readable medium includes computer-executable instructions which are executed on a computer. Support for this amendment may be found in Figure 1 and paragraphs 24-28 on pages 7-9 of the Specification. No new matter has been added by this amendment.

Claims 2, 12, and 22 have been amended to clarify that the value of interest comprises a multiple of the radius of each of the selected target locations. Support for this amendment may be found in paragraph 52 on page 17 of the Specification. No new matter has been added by these amendments.

Claims 9 and 19 have been amended to clarify that selecting target locations comprises ranking the selected target locations and displaying a user-selected percentage of the ranked target locations. Support for these amendments may be found in paragraph 55 on page 18 of the Specification. No new matter has been added by these amendments.

Claims 5, 7, 8, 15, 17, 18, 25, 27, and 28 have been amended to correct typographical errors noted by the Examiner and undersigned counsel for the Applicants. The amendments include changing the spelling of the term "CuWeight" to "CumWeight," changing the term "DistanceFrom Cell" to "DistanceFromCell," and changing the term "predetermine" to "predetermined." No new matter has been added by these amendments.

New claims 28-30 have been added that "a cumulative value" comprises at least one accumulated value. Support for these amendments may be found in paragraph 39 on page 13 and in paragraphs 41-46 on pages 14-15 of the Specification. In addition, those skilled in the art will appreciate that the term "cumulative" may be defined as a "made up of accumulated values." No new matter has been added by these amendments.

Claims 1-29 are currently pending in the application. The Drawings, the disclosure in the Specification, and Claims 5, 7, 8, 15, 17, 18, 25, 27, and 28 are objected to because of various informalities. Claims 1-29 stand rejected under 35 U.S.C. § 112, second paragraph. Claims 11-20 stand rejected under 35 U.S.C. § 101. Claims 1, 4-9, 11, 14-19, 21, 24-28 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Cullick et al. (U.S. Patent 6,549,879, hereinafter "Cullick"). Claims 2, 3, 12, 13, 22, and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cullick in view of Bush (U.S. Patent Application 2003/0204311). It is

noted for the record that U.S. Patent Application 2003/0201311 (Lindley) was mailed with the Office Action instead of Bush. Claims 10, 20, and 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cullick in view of Kocberber (U.S. Patent 5,740,342).

Drawings

The Examiner's objection to the drawings as explained in Form PTO-948 is noted. In response, Applicants will submit corrected drawings prior to issuance of the instant patent application.

Specification

The disclosure is objected to because of various informalities in paragraphs 42, 45, 6, 64, 65, and 66. As noted above in the section entitled "Amendments to the Specification," these informalities have been corrected in conformity with the Examiner's suggestions. Accordingly, the Examiner's objection to the disclosure should be withdrawn.

Claim Objections

Claims 5, 7, 8, 15, 18, 25, 27, and 28 are objected to because of various informalities. As noted above in the section entitled "Amendments to the Claims," these informalities have been corrected in conformance with the Examiner's suggestions.

Claim Rejections—35 U.S.C. §112, second paragraph

Claims 1-29 stand rejected as being indefinite. Specifically, claims 1, 2, 9, 11, 12, 19, 21, and 22 were identified as being indefinite. Regarding claims 1, 11, and 21, these claims have been amended to clarify that the plurality of values are characteristic of a reservoir. For instance, Figures 2 and 3 show an illustrative three-dimensional model representing the distribution of the values characterizing a reservoir (i.e., porosity and oil saturation values). In other illustrative embodiments of the invention the three-dimensional model may be triangulated to create a three dimensional grid of cells which may be filtered based on values characterizing a reservoir (as

shown, for example, in Figure 4). Regarding claims 2, 12, and 22, these claims have been amended to clarify that a “value of interest” comprises a multiple of the radius of each of the selected target locations. Regarding claims 9 and 19, these claims have been amended to clarify that selecting target locations comprises ranking the selected target locations and displaying a user-selected percentage of the ranked target locations. Based on the aforementioned amendments and discussion, it is respectfully submitted that the rejections of claims 1, 2, 9, 11, 12, 19, 21, and 22 under 35 U.S.C. §112, second paragraph should be withdrawn.

Claim Interpretations

The Examiner’s interpretations of claims 5, 15, and 25 is accepted as evidenced in the amendments of these claims (see above).

Claim Rejections—35 U.S.C. §101

Claims 11-20 stand rejected for claiming non-statutory subject matter. As noted above in the section entitled “Amendments to the Claims,” claims 11-20 have been amended in conformity with the Examiner’s suggestions. Accordingly, the Examiner’s rejections of claims 11-20 should be withdrawn.

Claim Rejections—35 U.S.C. §102

Claims 1, 4-9, 11, 14-19, 21, and 24-28 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Cullick. Amended independent claim 1 specifies a method of reservoir targeting. The method includes filtering a plurality values characterizing a reservoir in a three-dimensional model to eliminate values which are below a threshold to create a filtered three-dimensional model, developing a first matrix from the filtered three-dimensional model representing a two-

dimensional model of the reservoir, wherein the first matrix includes a plurality of cell center locations, cell areas, and the plurality of values, developing a second matrix from the first matrix using a distance-weighted sum of the plurality of values, and selecting target locations from the second matrix based on the distance-weighted sum of the plurality of values.

Cullick discloses a two-stage method for determining well locations in a 3D reservoir model. The first stage includes determining well locations for vertical wells while the second stage includes determining well location for horizontal or deviated wells. In the first stage, a 3D-reservoir quality volume is used to generate a 2D quality map. Each cell in the 2D array may be considered as a potential site where a well can be drilled. The method includes selecting a subset of the potential locations that will maximize the cumulative value of reservoir property locations while ensuring that the planar distance between the selected sites is over a certain specified minimum to avert well interference. The second stage includes determining well trajectories that connect maximum reservoir pay values while honoring configuration constraints. In both stages, the method includes optimizing a static measure based on a proxy value such as porosity, net pay, permeability, permeability-thickness, or pore volume. See Col. 3, lines 47-67 through Col. 4, lines 1-12 and Col. 9, lines 4-59.

Cullick, however, fails to teach, disclose, or suggest the filtering of values characterizing a reservoir and the development of a second matrix from a previously developed first matrix including a plurality of cell center locations, cell areas, and the plurality of values, where the second matrix uses a distance-weighted sum of the plurality of values from the first matrix. Cullick further fails to teach, disclose, or suggest selecting target locations from the second

matrix based on the distance-weighted sum. In response to the Office Action, it is respectfully submitted that Cullick does not disclose multiple matrices, in which one matrix uses the results of another matrix, based on a distance-weighted sum, as alleged. Therefore, in view of the foregoing, amended independent claim 1 is allowable over Cullick and the rejection of claim 1 should be withdrawn.

Claims 4-9 depend from amended independent claim 1 and thus are allowable for at least the reasons stated above with respect to claim 1 as well as the additional features set forth therein. For example, dependent claim 5 specifies that developing the second matrix further comprises deriving a cumulative value associated with each center location using the relationship: $\text{cumulative value} = (\text{CumWeightedValue} / \text{CumWeightedArea}) * \text{CumWeight}$, wherein

$$\text{CumWeightedValue} = \sum \text{cellvalue} * \text{weight},$$

$$\text{CumWeightedArea} = \sum \text{cellarea} * \text{weight}, \text{ and}$$

$\text{CumWeight} = \sum (\text{SpacingRadius} - \text{DistanceFromCell}) / \text{SpacingRadius}$, where SpacingRadius is a user-defined value and DistanceFromCell is defined as one of the larger of an actual distance from a cell under consideration to an adjacent cell and half the diagonal cell width; and dependent claim 9 specifies that selecting target locations further comprises ranking the selected target locations and displaying a user-selected percentage of the ranked target locations. Based on the discussion above Cullick fails to teach, suggest, or disclose the aforementioned features. Accordingly, the rejections of dependent claims 4-9 should also be withdrawn.

Amended independent claims 11 and 21 specify similar features as amended independent claim 1, discussed above. As discussed above, Cullick fails to teach, disclose, or suggest each of the features specified in amended independent claim 1. Therefore, in view of the foregoing, amended independent claims 11 and 21 are allowable over Cullick and the rejections of these claims should be withdrawn. Claims 14-19 and 24-28 depend from amended independent claims 11 and 21, respectively, and thus are allowable for at least the reasons stated above with respect to claims 11 and 21 as well as the additional features set forth therein. Accordingly, the rejections of dependent claims 14-19 and 24-28 should also be withdrawn.

Claim Rejections—35 U.S.C. §103

Claims 2, 3, 12, 13, 22, and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cullick in view of Bush. Claims 2-3, 12-13, and 22-23 depend from amended independent claims 1, 11, and 21, respectively and thus include the same features as these claims as well as the additional features recited therein. In particular, claims 2, 12, and 22 specify developing the first matrix by windowing one or more cells from the filtered three-dimensional model to determine a center point location with a value of interest, wherein the value of interest comprises a multiple of the radius of each of the selected target locations while claims 3, 13, and 23 specify determining the windowing of the one or more cells based on the number of layers in the filtered three-dimensional model of the reservoir.

As discussed above, Cullick fails to teach, disclose, or suggest the features specified in claims 2-3, 12-13, and 22-23. Bush, relied upon to cure the deficiencies of Cullick, discloses a method for the automated delineation of hydrocarbon accumulations from seismic data. The

method includes developing a neural network using data indicating productive areas and data indicating nonproductive areas and applying the neural network to at least a portion of the data to distinguish producing areas from non-producing areas (Par. 39). Bush, however, fails to teach, disclose, or suggest the filtering of values characterizing a reservoir and the development of a second matrix from a previously developed first matrix including a plurality of cell center locations, cell areas, and the plurality of values, where the second matrix uses a distance-weighted sum of the plurality of values from the first matrix. Bush further fails to teach, disclose, or suggest selecting target locations from the second matrix based on the distance-weighted sum. Bush further fails to teach, disclose, or suggest a value of interest comprising a multiple of the radius of each of the selected target locations. Based on the foregoing, neither Cullick nor Bush, alone or in combination, teaches, discloses, or suggests each of the features specified in claims 2, 3, 12, 13, 22, and 23. Accordingly, the rejections of these claims should be withdrawn.

Claims 10, 20, and 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cullick in view of Kocerber. Claims 10, 20, and 29 depend from amended independent claims 1, 11, and 21, respectively and thus include the same features as these claims as well as the additional features recited therein. Kocerber discloses a method of generating a three-dimensional hybrid grid for geological formations with a sloping fault (Col. 2, lines 13-20). Kocerber, however, fails to teach, disclose, or suggest the filtering of values characterizing a reservoir and the development of a second matrix from a previously developed first matrix including a plurality of cell center locations, cell areas, and the plurality of values, where the

second matrix uses a distance-weighted sum of the plurality of values from the first matrix. Kocberber further fails to teach, disclose, or suggest selecting target locations from the second matrix based on the distance-weighted sum. Based on the foregoing, neither Cullick nor Kocberber, alone or in combination, teaches, discloses, or suggests each of the features specified in claims 10, 20, and 29. Accordingly, the rejections of these claims should be withdrawn.

New Claims

New claims 28, 29, and 30 depend from depend from amended independent claims 1, 11, and 21, respectively, and thus are allowable for at least the reasons stated above with respect to these claims 11 and 21 as well as the additional features set forth therein. Accordingly, it is respectfully submitted that claims 28-30 are in condition for allowance.

Conclusion

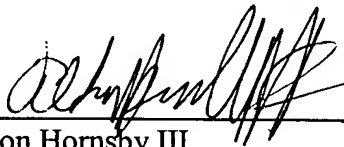
In view of the foregoing amendments and remarks, this application is now believed to be in a condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is invited to call directly Applicants' attorney at the number listed below.

If any additional fees are required for the timely consideration of this application, please charge Deposit Account Number 13-2725.

Respectfully submitted,

MERCHANT & GOULD

Date: September 23, 2004



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